

**PATENT APPLICATION**

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE  
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES**

In re application of

Docket No: Q87983

Jean BEGUINOT, et al.

Appln. No.: 10/535,174

Group Art Unit: 1793

Confirmation No.: 2367

Examiner: Jie YANG

Filed: March 17, 2006

For: WELDABLE COMPONENT OF STRUCTURAL STEEL AND METHOD OF MANUFACTURE

**SUBMISSION OF APPEAL BRIEF**

**MAIL STOP APPEAL BRIEF - PATENTS**

Commissioner for Patents

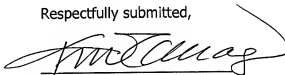
P.O. Box 1450

Alexandria, VA 22313-1450

Sir:

Submitted herewith please find an Appeal Brief. The USPTO is directed and authorized to charge the statutory fee of \$540.00 and all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



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WASHINGTON OFFICE

**23373**

CUSTOMER NUMBER

Date: November 30, 2009

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**APPEAL BRIEF UNDER 37 C.F.R. § 41.37**

**MAIL STOP APPEAL BRIEF - PATENTS**

Commissioner for Patents

P.O. Box 1450

Alexandria, VA 22313-1450

Sir:

In accordance with the provisions of 37 C.F.R. § 41.37, Appellant submits the following:

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**I. REAL PARTY IN INTEREST**

The real party in interest is Industreel Creusot.

**II. RELATED APPEALS AND INTERFERENCES**

Appellants, Appellants' legal representative and the Assignee of this application are not aware of any other appeals or interferences that will directly affect, or be affected by, or have a bearing on the Board's decision in the pending appeal.

**III. STATUS OF CLAIMS**

Claims 1-11 are pending in the application.

Claims 6-11 are withdrawn from consideration.

Claims 1-5 are rejected.

This is an appeal from the Examiner's rejections of claims 1-5 under 35 U.S.C. § 103(a).

**IV. STATUS OF AMENDMENTS**

The claims were amended in a Preliminary Amendment. There are no outstanding amendments to the claims or to the specification in the present application.

**V. SUMMARY OF THE CLAIMED SUBJECT MATTER**

Independent claim 1 is directed to a weldable component of structural steel. *See* page 1, lines 4-5. The chemical composition comprises, by weight:

$$0.40\% \leq C \leq 0.50\%$$

$$0.50\% \leq Si \leq 1.50\%$$

$$0\% \leq Mn \leq 3\%$$

$$0\% \leq Ni \leq 5\%$$

$$0\% \leq Cr \leq 4\%$$

$$0\% \leq Cu \leq 1\%$$

$$0\% \leq Mo + W/2 \leq 1.5\%$$

$$0.0005\% \leq B \leq 0.010\%$$

$$N \leq 0.025\%$$

$$Al \leq 0.9\%$$

$$Si + Al \leq 2.0\%,$$

optionally at least one element selected from V, Nb, Ta, S and Ca, at contents of less than 0.3%, and/or from Ti and Zr at contents of less than or equal to 0.5%, the remainder being iron and impurities resulting from the production operation. *See* page 2, lines 15-29. The contents of aluminum, boron, titanium and nitrogen, expressed in thousandths of %, of the composition also satisfying the following relationship:

$$B \geq \frac{1}{3} \times K + 0.5, \quad (1)$$

with  $K = \text{Min} (I^* ; J^*)$

$$I^* = \text{Max} (0 ; I) \quad \text{and} \quad J^* = \text{Max} (0 ; J)$$

$$I = \text{Min}(N ; N - 0,29(Ti - 5))$$

$$J = \text{Min} \left( N ; 0,5 \left( N - 0,52 \text{ Al} + \sqrt{(N - 0,52 \text{ Al})^2 + 283} \right) \right). \text{ See page 3,}$$

lines 1-8. The structure is bainitic, martensitic or martensitic-bainitic and also comprises from 3 to 20% of residual austenite. See page 3, lines 9-11.



**VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL**

An issue on appeal is whether the Examiner improperly rejected claims 1-5 under 35 U.S.C. § 103(a) as allegedly being unpatentable over Vander Voort (US 4,171,233) or Bhadeshia (WO 96/22396).

**VII. ARGUMENT**

The Examiner has rejected claims 1-5 under 35 U.S.C. § 103(a) as allegedly being unpatentable over Vander Voort (US 4,171,233) or Bhadeshia (WO 96/22396).

A *prima facie* showing of obviousness requires (1) a suggestion or motivation in the references or in the knowledge of one of ordinary skill in the art, to modify the references or to combine reference teachings; (2) a reasonable expectation of success; and (3) a teaching or suggestion of all claimed limitations.

It is respectfully submitted that a *prima facie* case of obviousness has not been established.

Claim 1 is directed to a weldable component of structural steel, characterized in that its chemical composition comprises, by weight:

$$0.40\% \leq C \leq 0.50\%$$

$$0.50\% \leq Si \leq 1.50\%$$

$$0\% \leq Mn \leq 3\%$$

$$0\% \leq Ni \leq 5\%$$

$$0\% \leq Cr \leq 4\%$$

$$0\% \leq Cu \leq 1\%$$

$$0\% \leq Mo + W/2 \leq 1.5\%$$

$$0.0005\% \leq B \leq 0.010\%$$

$$N \leq 0.025\%$$

$$Al \leq 0.9\%$$

$$\text{Si} + \text{Al} \leq 2.0\%$$

optionally at least one element selected from V, Nb, Ta, S and Ca, at contents of less than 0.3%, and/or from Ti and Zr at contents of less than or equal to 0.5%, the remainder being iron and impurities resulting from the production operation. The contents of aluminum, boron, titanium and nitrogen, expressed in thousandths of %, of the composition also satisfying the following relationship:

$$B \geq \frac{1}{3} \times K + 0.5, \quad (1)$$

$$\text{with } K = \text{Min}(I^* ; J^*)$$

$$I^* = \text{Max}(0 ; I) \quad \text{and} \quad J^* = \text{Max}(0 ; J)$$

$$I = \text{Min}(N ; N - 0.29(Ti - 5))$$

$$J = \text{Min}\left(N ; 0.5\left(N - 0.52 \text{ Al} + \sqrt{(N - 0.52 \text{ Al})^2 + 283}\right)\right),$$

and whose structure is bainitic, martensitic or martensitic-bainitic and also comprises from 3 to 20% of residual austenite.

A main feature of the present invention is the synergy between boron and silicon. *See e.g.*, page 4, lines 19-24 of the present specification. That is, the addition of silicon at contents set forth in claim 1 enables the quenching effect of boron to be increased by from 30 to 50%.

Regarding Vander Voort, the Examiner asserts that Vander Voort teaches a steel with a composition overlapping with the claimed ranges. The Examiner takes the position that it would have been obvious to one of ordinary skill in the art at the time the invention was made to select the claimed compositions of C, Si, Mn, Ni, Cr, Mo, W, B, Al, V, Nb, S, Ti, and Fe

because Vander Voort discloses the same utility and because weldability is a property of the alloy, which depends on alloy's composition and heat treatment. Additionally, the Examiner asserts that because Vander Voort teaches austenitizing, cooling and tempering, the asserted weldability would be highly expected for the steel of Vander Voort.

Appellants respectfully disagree.

Vander Voort describes a steel for molds that can contain boron. However, when the steel does contain boron, the silicon content is limited. See the formula related to surface roughness, col. 10, lines 8-15; Tables IV and V; col. 5, lines 29-59. Indeed, in the Examples, the amount of silicon present is at most 0.29% when boron is contained.

In addition, one of ordinary skill in the art would not modify the steel of Vander Voort to arrive at the claimed amount of silicon. There is no teaching in Vander Voort regarding any relationship between silicon and boron. In fact, Vander Voort can be considered as teaching away from such relationship since it teaches steels that are boron free. Thus, one of ordinary skill in the art would not be motivated to modify the amount of silicon and boron in the steel to arrive at the claimed ranges.

Furthermore, since Vander Voort does not consider weldability of the steel and the steel does not simultaneously contain boron and high silicon, one of ordinary skill in the art would not expect the weldability of the steel of Vander Voort to be high. Indeed, it is submitted that the synergistic effects of the combination of silicon and boron are unexpected from Vander Voort.

Thus, it is respectfully submitted that claim 1 is patentable over Vander Voort.

Regarding Bhadeshia, the Examiner asserts that Bhadeshia teaches a steel with a composition overlapping with the claimed ranges. In addition, the Examiner asserts that it

would have been obvious to one of ordinary skill in the art at the time the invention was made to select the claimed compositions of C, Si, Mn, Ni, Cr, Mo, W, B, Al, V, Nb, S, Ti, and Fe because Bhadeshia discloses the same utility throughout the disclosed ranges.

Applicants respectfully disagree.

Bhadeshia describes a steel for rails having good weldability due to the structure, which is bainitic after air cooling. *See* page 6, second paragraph. This steel is able to be used to produce parts having special structures. However, the carbon content is less than 0.5%, or better yet, less than 0.35%. *See* page 8, Table 1 and the following paragraph. Furthermore, boron is only optional. *See e.g.*, claims 1 and 2 or claims 8 or 9. Indeed, all of the Examples are outside the scope of claim 1. *See* page 10, first paragraph (one example contains 0.22% C and no boron and the other examples contain 0.24% of C).

Moreover, Bhadeshia does not give disclose any indication concerning a possible advantage resulting from simultaneous presence of boron and a high content of silicon. That is, similar to Vander Voort, Bhadeshia fails to disclose any relationship between silicon and boron. Indeed, Bhadeshia teaches that boron is only optional. *See e.g.*, claims 1 and 2 or claims 8 or 9. Since such relationship between silicon and born is not taught or suggested, one of ordinary skill in the art would not be led to modify the steels of Bhadeshia to arrive at the claimed ranges. In addition, the synergistic effects of the combination of silicon and boron are unexpected from Bhadeshia.

Accordingly, it is respectfully submitted that claim 1 is patentable over Bhadeshia.

For at least the above reasons, it is respectfully submitted that the present invention is not taught or suggested by the cited references, and that the present invention would not be obvious to one of ordinary skill in the art.

In addition, claims 2-5 depend from claim 1, and thus it is respectfully submitted that these claims are patentable for at least the same reasons as claim 1.

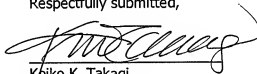
In view of the above, Appellants respectfully submit that neither Vander Voort nor Bhadesia render the present invention obvious.

**Conclusion**

For at least the above reasons, Appellants respectfully submit that the obviousness rejection should be reversed.

The USPTO is directed and authorized to charge the statutory fee (37 C.F.R. §41.37(a) and 1.17(c)) and all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



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**CLAIMS APPENDIX**

CLAIMS 1-5 ON APPEAL:

1. Weldable component of structural steel, characterized in that its chemical composition comprises, by weight:

$$0.40\% \leq C \leq 0.50\%$$

$$0.50\% \leq Si \leq 1.50\%$$

$$0\% \leq Mn \leq 3\%$$

$$0\% \leq Ni \leq 5\%$$

$$0\% \leq Cr \leq 4\%$$

$$0\% \leq Cu \leq 1\%$$

$$0\% \leq Mo + W/2 \leq 1.5\%$$

$$0.0005\% \leq B \leq 0.010\%$$

$$N \leq 0.025\%$$

$$Al \leq 0.9\%$$

$$Si + Al \leq 2.0\%$$

optionally at least one element selected from V, Nb, Ta, S and Ca, at contents of less than 0.3%, and/or from Ti and Zr at contents of less than or equal to 0.5%, the remainder being iron and impurities resulting from the production operation,  
the contents of aluminium, boron, titanium and nitrogen, expressed in thousandths of %, of the composition also satisfying the following relationship:

$$B \geq \frac{1}{3} \times K + 0,5, \quad (1)$$

with  $K = \text{Min}(I^* ; J^*)$

$$I^* = \text{Max}(0 ; I) \quad \text{and} \quad J^* = \text{Max}(0 ; J)$$

$$I = \text{Min}(N ; N - 0,29(Ti - 5))$$

$$J = \text{Min} \left( N ; 0,5 \left( N - 0,52 \text{ Al} + \sqrt{(N - 0,52 \text{ Al})^2 + 283} \right) \right),$$

and whose structure is bainitic, martensitic or martensitic-bainitic and also comprises from 3 to 20% of residual austenite.

2. Steel component according to claim 1, characterized in that its chemical composition also satisfies the following relationship:

$$1.1\% \text{Mn} + 0.7\% \text{Ni} + 0.6\% \text{Cr} + 1.5(\% \text{Mo} + \% \text{W}/2) \geq 1 \quad (2)$$

3. Steel component according to claim 2, characterized also in that its chemical composition satisfies the following relationship:

$$1.1\% \text{Mn} + 0.7\% \text{Ni} + 0.6\% \text{Cr} + 1.5(\% \text{Mo} + \% \text{W}/2) \geq 2 \quad (2)$$

4. Steel component according to claim 1, characterized in that its chemical composition also satisfies the following relationship:

$$\% \text{Cr} + 3(\% \text{Mo} + \% \text{W}/2) \geq 1.8.$$

5. Steel component according to claim 4, characterized in that its chemical composition also satisfies the following relationship:

$$\% \text{Cr} + 3(\% \text{Mo} + \% \text{W}/2) \geq 2.0.$$



**EVIDENCE APPENDIX:**

Pursuant to 37 C.F.R. § 41.37(c)(1)(ix), submitted herewith are copies of any evidence submitted pursuant to 37 C.F.R. §§ 1.130, 1.131, or 1.132 or any other evidence entered by the Examiner and relied upon by Appellant in the appeal.

None.

**RELATED PROCEEDINGS APPENDIX**

Submitted herewith are copies of decisions rendered by a court or the Board in any proceeding identified about in Section II pursuant to 37 C.F.R. § 41.37(c)(1)(ii).

None.